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THE EFFECT OF TYPEWRITING ON SEVENTH GRADE STUDENTS' ABILITY TO RECOGNIZE COMPOSITION ERRORS

by

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E. R. P. D.

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BACKGROUND AND PURPOSE OF THE STUDY

Introduction

> Any person who fails to acquire the language habits that function in the major affairs of his country, the language habits of the people who are socially acceptable in most of our communities, is under a serious handicap. The schools, therefore, assume the task of helping every boy and girl, no matter what his social background or native speech, to learn to listen, speak, read, and write English that meets these common standards (Strickland, 1964a, p. 30).

Our society places a great deal of importance on education. In particular, proficiency in language is highly valued and is considered to be a distinguishing characteristic of educated people. The language arts occupy the central position in the curriculum. Not only is language used functionally in every subject area, but students are required to take specific courses in the English language arts through the eleventh or twelfth grade.

In spite of this favored position in the curriculum, however, students' ability to use the English language has been a frequent target of criticism. Students' writing ability, in particular, has received considerable attention. Criticism has been leveled at the schools on the grounds that many students and graduates do not meet the writing standards expected by our society. In the face of such criticism, educators are evaluating current teaching practices and

examining possible new techniques and approaches that will, hopefully, improve instruction and raise students' level of writing competency.

Background and Need for the Study

Learning to write effectively is a large and complex task. It has been described variously as an art, a skill, and a tool. In its function as a vehicle for recording information and ideas, it is all of these, and an important component of students' educational experience. Whatever subject or area of the curriculum, some writing is almost certain to be required.

Although writing is inherent in most subjects taught in schools, attention to effective writing is frequently considered to be the sole responsibility of the English teacher. She is thus concerned with helping students of all levels of ability develop proficiency in writing, adequate to meet not only the needs of the language arts curriculum but also, to meet needs in other subject areas.

Proficiency in writing is not easy to acquire. Ruth Strickland (1964b) points out, "Writing is the last of the language arts with which children achieve independence and control and its mastery requires many years of expansion, refinement, and maturing (p. 232)." Wheeler and Wheeler (1964) state, "The expressive arts are psychologically more complex than reading or listening. . . Oral reading and writing require much more neurological activity than silent reading and listening (p. 444)." They suggest that hearing and speaking might be considered natural language skills, and reading and writing acquired skills.

Writing necessitates the conscious use of linguistic ability. In addition to knowledge of the sound system and syntax, a writer must learn to use acceptable writing conventions of his society such as spelling, capitalization, and punctuation. In this respect, the writer faces a more complex task than the speaker; not only must he think what he wants to say but he must transcribe the verbal symbols into graphic form.

The most common criterion for judging the effectiveness of language arts instruction is students' proficiency in writing. Critics of contemporary education point out the inadequate writing ability of many students and graduates. One cannot deny that the condition exists; it is not difficult to find examples of poor writing at any level of education. Thomas M. Cooley II (1961), dean of the law school at the University of Pittsburgh wrote,

> A major and malignant disease has taken hold in the body of American education: the graduates of our colleges, including our best ones, cannot write the English language. This is not hyperbole. My long-time friend and classmate, Dean William C. Warren of Columbia, has rung the changes on this situation. His colleagues in the medical, engineering and other graduate schools of the nation have abandoned indignant commentary on their students' inability to write. They accept it as a sorry fact of academic life (p. 39).

There is little doubt that educators are, and should be, concerned about students' writing ability. A perusal of the many new curriculum projects and guides give evidence that steps are being taken to improve writing instruction. Recognizing the need for greater writing competencies has led educators to consider both the nature of the writing task and possible techniques of instruction to effect greater proficiency in writing for more students.

Writing is uniquely personal; it involves mental and physical activity of an individual. The investigator speculated that it might be this very intimacy of writer and his written composition that blinds him to its imperfections. If so, development of a personal writing conscience, as a prerequisite to correct writing, might be accomplished through use of a less personal form of writing. Perhaps if students' papers were written in typescript they would proofread more objectively and thus recognize more writing errors. Experiences of the investigator have shown that students find many errors in checking other students' papers, yet do not notice the same errors on their own papers. Perhaps seeing their written work in typewritten form instead of in their personal handwriting would tend to make it less personal and would facilitate recognition of errors.

Experimental studies in typewriting at the elementary level have reported various educational gains. In rather short periods of time, experimental groups of students using typewriters have shown greater progress than control groups in nearly every subject in the curriculum. Perhaps junior high school students, using typewriting in the context of the language arts program, would develop a greater awareness of writing errors. It was with this idea in mind that this study was designed and carried out.

Statement of the Problem

The purpose of this study was to determine the relationship of typewriting to seventh grade students' awareness of writing errors.

The study was designed to show whether or not students recognize more writing errors when their compositions are typewritten than when they are handwritten. Also, the study compared the effectiveness of two kinds of practice involving use of the typewriter in language arts classes. Answers were sought to these questions:

1. Do students recognize more writing errors when their compositions are typewritten than when they are in their own handwriting?
2. Does practice in typewriting their own language arts assignments facilitate students' recognition of writing errors in compositions?
3. Does practice in seeing their language arts assignments that have been reproduced in typewriting by someone else facilitate students' recognition of writing errors in compositions?

In considering these problems, further questions arose as to whether or not improvement in recognition of writing errors as a result of typewriting was related to certain individual differences of students. For example, ability to recognize errors could be related to intellectual ability. Students with high intelligence tend to perform many tasks better and at an earlier age than students of lower intelligence. Would it follow, then, that highly intelligent students were consistently better at recognizing writing errors? Or, perhaps ability to recognize writing errors was related to reading ability. Both skills require controlled eye movement, fixations and ability to distinguish between shapes. Perhaps success in recognizing writing errors is closely

related to success in reading. Handwriting was another possibility. Handwriting might contribute to difficulty in recognizing writing errors in that poor handwriting might tend to mask errors and make them more difficult to recognize.

CHAPTER II

REVIEW OF LITERATURE

Although formal instruction in typewriting has traditionally been placed at the high school level, typewriting in the junior high school is not a new curriculum innovation. Typewriting has been taught in some junior high and elementary schools throughout the United States for many years. Today's trend is toward an increasing number of junior high schools that offer typewriting courses, usually at the ninth grade and patterned after the prevocational course taught at the high school. Typewriting in the elementary school has been explored as an aid in improving various language arts skills.

A search for literature concerning typewriting instruction related to the junior high school language arts program has revealed few studies. Most experimentation and research in the use of the typewriter to improve language arts skills has been done at the elementary level. However, writers in business education publications indicate a growing interest in typewriting programs in both the junior and senior high school. These programs are oriented toward the personal typewriting needs of students rather than prevocational training. Some schools offer personal typewriting courses in the regular school term while others offer such course only during summer sessions.

In predicting the future of typewriting, Lloyd (1969) stated

that he expected to see changes in typewriting not only in academic level but also in objectives. He cited the increase in the number of students enrolled in junior high school typewriting classes since 1960, and the tendency to include instruction in typewriting term papers and other school assignments in typewriting class instead of holding strictly to a prevocational course. He predicted:

> Because language-arts emphasis is so much more compatible with the tools of the junior high school and because growth in language arts is a critical need of the age group, it is likely that junior high school typing in the future will be of the language-arts variety (p. 25).

Changing an existing typewriting curriculum necessitates development of new teaching materials. Morrison (1958) reported a study in which experimental materials were used at the ninth grade level. Typewriting materials for the experimental group emphasized original writing of a general business nature plus various drills, such as spelling, composition, and punctuation. These were substituted in place of some of the usual production work. She found that students in the experimental group showed gains comparable to those of the control group in capitalization, grammar, punctuation, and sentence structure as well as equal typing proficiency. In addition, students in the experimental group showed greater interest because of the materials. She concluded that typewriting instruction could use language skills objectives and could be a functional approach to thinking and written expression.

General Educational Value of Typewriting

Advocates of typewriting in the language arts curriculum feel that learning to typewrite serves a purpose beyond that of teaching a

student to operate a typewriter. Lloyd (1969) stated,

> Any course in typewriting conveys not one but two general outcomes. One of these is the ability to operate the machine. The other outcome is what the learner absorbs from the thousands and thousands of words that pour through his fingers as he practices typewriting exercises . . . an author can convey any of many different bodies of knowledge. He can reinforce spelling for a fifth grader, help an eighth grader write family correspondence, teach office decorum to the high school student, or transmit almost anything else that might be desired (p. 10).

A study reported by McLeod (1965) illustrates the value of typewriting as a means of gaining other knowledge. Foreign students enrolled in an English language class at San Francisco State College were placed into two groups by equating their language ability and opportunity to learn. Both groups completed the regular American Language Institute program of twenty-five classroom hours a week for twelve weeks. The experimental group spent three of the class hours each week in typewriting instruction. Pretest and posttest mean scores on English language achievement tests were compared and the experimental group was found to be significantly higher than the control group.

Brendel (1963), Capehart and McNish (1959), and Lajoie (1954) felt that all areas of the language arts improved as a result of typewriting. Perhaps this was due to the fact that in typewriting students are compelled to consciously look at the components of words, sentences, and paragraphs. They focus their attention on the writing process.

Many students need emphasis on the mechanics of writing and do not find it in their regular language arts classes. In today's

curriculum there is a great deal of emphasis on creativity and teachers of language arts are reluctant to point out writing inefficiencies for fear of stifling students' creative thinking. Although teachers may not condone poor writing habits, creativity is considered more important. In typewriting, students' attention is focused on the production of a printed page. Some educators feel that students attention to detail while reproducing their creative works in typewriting develops an awareness of form and correctness.

Writing from the point of view of the typewriting teacher, Brendel (1963a) suggested that the potential value of typewriting, on students' general education, needed to be given attention. He stated,

> Typewriting is one course in business education that can and should provide for greater educational service. It is one course that needs to be re-evaluated, possibly rebuilt, to provide for the reteaching and the frequent use of certain basic knowledges that have a direct relation to it--especially in reading, spelling, punctuation and proofreading . . . (p. 13).

As early as 1932, Wood and Freeman reported a study of the educational influence of the typewriter. The study involved approximately 400 teachers and 15,000 elementary students from kindergarten through sixth grade in several cities across the United States for a two year period. Achievement tests indicated that students using typewriters made greater gains than students instructed by regular methods, in grades three through six. Teachers of primary grades also thought their students had made significant gains but findings did not substantiate their opinion. There was no observable loss, however, in level

of achievement at any grade level. A general observation of teachers participating in the study was that typewriting stimulated students to write more.

More recent studies by Tate (1943) and Tootle (1961) reported the general educational value of typewriting at the elementary level. Tate experimented with students in the lower half of their classes in fourth, fifth, and sixth grades. Students in the experimental groups spent one period a day for eighty-five days in typewriting instruction. Achievement test scores for the experimental group showed greater improvement in language, spelling, vocabulary, and paragraph meaning as compared to the control group.

The experimental study by Tootle used matched pairs of fifth grade students. The experimental group was given typewriting instruction, using materials especially designed for the study. At the end of the school year tests were given to measure general educational development. Comparisons with the control group showed that the experimental group was significantly higher in arithmetic achievement and were higher, though not significantly, in science, reading, and social studies study skills achievement. The experimental group was significantly lower in social studies information achievement. The negative effect was thought to be due to the fact that no attempt was made to incorporate social studies information in the typewriting materials and because time used for typewriting might have been used in acquiring social studies information.

A study by Grindberg (1966) investigated the change in achievement of students who had taken a summer typewriting course at the end

of the sixth grade. The language arts sections of achievement tests taken in the sixth grade were compared with similar tests taken in the eighth grade. The experimental group had higher mean scores, but the difference was not significant.

Although most of the literature reviewed voiced optimism for typewriting in the elementary school, a few writers, such as Woolschlager (Erickson & Woolschlager, 1962), questioned the value of providing typewriting at the elementary level. He felt that children of elementary school age were not mature enough to understand the significance of necessary rules of procedure, and that they do not use typewriting skills in preparing assignments until high school age. The main point of those opposed to typewriting in the elementary school seemed to be that the results did not justify the added expense and effort.

There is little question that students can learn to typewrite as early as the elementary grades. Rather, the questions concerning typewriting in the language arts program centers on <u>when</u> students should be given typewriting instruction and <u>how much</u> typewriting instruction and practice aids the development of language arts skills.

A number of writers have written enthusiastically about the motivation and general educational value of typewriting, but research studies showing statistically significant gains are limited. In summarizing research on the typewriter as an instructional tool in the elementary school, Capehart and McNish (1959) concluded,

> These studies, in general, report that the portable typewriter is of value as an aid which contributes to almost all phases of learning. Specifically, the research provides evidence that,

through using the typewriter:

> Children tend to spell, read, and write better;
>
> Their papers are neater: they learn to punctuate, paragraph, and proof read;
>
> They make more projects, displays;
>
> They take pride in their work: they tend to have an improved attitude toward school work;
>
> They become more responsible, more independent;
>
> They feel more successful, more self-confident,
>
> Creative expression is stimulated;
>
> And they are able to acquire typing skill (p. 23).

They also stated that reports of research and experimentation leave some questions unanswered.

> Reports do not agree on how much typewriting improves learning, when training should be introduced, what materials and methods are most effective, or who should teach typewriting (p. 26).

Individual Differences of Students

Literature reviewed thus far has dealt with typewriting for generalized groups of students. Because this study is concerned with the relationship of typewriting to individual differences of students in intelligence, reading achievement, and quality of handwriting, a search was made for literature in which these differences were considered.

Intelligence

In considering the relationship of typewriting and intelligence, McWilliams (1960) pointed out that students with high ability are often

given special enrichment classes because regular class work is easily accomplished and students need additional challenge. Typewriting is one of the classes frequently offered. Able students tend to show interest in such language arts activities as a school newspaper, creative writing, and special interest reports. Typewriting ability is a useful tool for these activities.

It appears likely, however, that the value of typewriting for able students is more to facilitate their activities then to improve language arts skills. A study by Mulligan (1965) explored the relationship between intelligence and writing competency. Students with higher intelligence made complex grammatical errors while those with lower intelligence made errors in simple construction. The percentage of grammatical errors and of types of errors decreased as intelligence increased. This being the case, the analytical aspect of typewriting would not be beneficial to students with higher intelligence. However, ability to typewrite would facilitate their creative efforts in the language arts area and, for this reason, be desirable.

A direct relationship between intelligence and typewriting was reported in a study by Staples (1965) to identify the basic abilities needed to detect typescript errors. The study was conducted using a population of students in secretarial science and career secretaries as subjects. Results showed a significant relationship between intelligence and ability to detect typescript errors. Age and education were not significantly related to error detection.

Lovitt (1968) stated the opinion that slow learners, especially,

should be taught to typewrite. She reported that their progress was slower, but that the ability to typewrite gave them a sense of accomplishment and possible job opportunities. She further explained that typewriting training can help a slow learner analyze his weaknesses and overcome them through selected drills. Students with lower ability were motivated by the mechanical nature of typewriting and benefited from the letter by letter building of words and sentences. Through such close analysis they focused on the mechanics of writing.

Other writers have also mentioned that use of the typewriter appeared to motivate students. Lajoie (1954) noted a tendency for superior but lazy pupils to improve academically as a result of learning to typewrite. Various writers have reported that students increased their output of written materials as a result of learning to typewrite.

Reading Achievement

A number of studies have indicated that students improve in reading achievement as a result of typewriting practice. Rowe (1959) reported a gain of seven months in reading vocabulary and four months in comprehension by third and fourth grade students in an eight week summer typewriting course.

O'Hara (1968) reported reading gains in a study of typewriting for slow learners. The study involved nineteen junior high school students for a period of four months. All students were at least two years below grade level in reading. She found that students not only enjoyed the class but were motivated to do more reading. Proofreading

of typewritten materials enabled students to analyze their successes and problems. Comparison of reading achievement tests at the beginning and end of the study showed a mean gain of one year and seven months in vocabulary for the group, and a mean gain of seven months in comprehension. In addition, teachers in other subjects reported that the students had made outstanding improvement in work habits, self-confidence, and attitude toward school.

Gains in reading achievement as a result of typewriting indicate an interrelationship of the language arts. Wood (1964) pointed out that learning to typewrite required ability to read the copy to be written and to transfer it letter by letter. The learners' ability to read and understand the copy, and his ability to spell, were all related to his success in typewriting.

A study by Mulligan (1965) verified a relationship of writing errors and reading ability. Results showed that the percentage of both grammar errors and types of errors decreased as reading ability increased.

Quality of Handwriting

In considering the effect of the typewriter on junior high school students' language arts achievement, the relationship between the typewriter and students' handwriting needs to be considered. Two avenues of thought are suggested. One has to do with increased readability of typescript as compared to handwriting, and the other, with the motivational effect of typewriting on students' quality and speed of handwriting.

Legibility of handwriting would seem to be an important factor in students' ability to recognize writing errors. Readability factors are given careful consideration by publishers in an effort to make print easier to read. Guidelines for optimum print are available, such as those by Paterson and Tinker (1940). Style of print and spatial arrangement on a page are known to directly influence efficiency and speed of reading. It would seem, then, that when students have difficulty seeing their writing errors, readability factors might be part of the problem. Legibility of handwriting not only involves adequate but consistent spacing between words and lines. In addition, the writer must form individual letters according to standard patterns or models.

In the 1920's a new form of writing--manuscript--was introduced in some schools at the primary level in an effort to improve the teaching of writing. Although most schools transfer to cursive writing in the third grade, there is evidence that some students, particularly boys (Templin, 1964), prefer manuscript form. A study by Bell (1939) indicated that both typewriting and manuscript writing can be read faster than cursive writing.

Quint (1958) did a study in aversion to handwriting. She found that children of high intelligence dislike handwriting practice less than those of low intelligence. She also found that aversion to writing is related to motor ability.

A number of writers have stated that typewriting actually improves students' handwriting. Tootle (1961) and Erickson (1962)

reported significant gains in both quality and speed of handwriting after typewriting instruction. Lajoie (1954) attributed the improvement of handwriting to "the neatness of the typed page and the symmetry of perfectly legible type letters, signs, and numbers. Presented with this challenge, the child tries to emulate or surpass what he sees (p. 11)."

CHAPTER III

RESEARCH PROCEDURES

This study was planned to evaluate the contribution of the typewriter in improving the writing skills of seventh grade students. The problem was to determine whether or not the use of the typewriter facilitated students' recognition of their writing errors. Following the discussion in Chapter I, these questions are posed:

1. Do students recognize more writing errors when their compositions are typewritten than when they are in their own handwriting?
2. Does practice in typewriting their own language arts assignments facilitate recognition of writing errors in compositions?
3. Does practice in seeing their language arts assignments that have been reproduced in typewriting by someone else facilitate students' recognition of writing errors in compositions?

A further consideration was the possibility that these questions might be related to individual abilities of students such as intelligence, reading achievement, and quality of handwriting.

Hypotheses

In seeking answers to the questions posed, the following

hypotheses and subhypotheses were formulated as a basis for research:

1. Seventh grade students recognize a significantly greater number of their writing errors when their compositions are typewritten than when they are handwritten.

   1a. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their intelligence.

   1b. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their reading achievement.

   1c. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their quality of handwriting.

2. Seventh grade students who have practice in typewriting their language arts assignments recognize a significantly greater number of writing errors in their compositions than seventh grade students who have used only handwriting in their language arts assignments.

   2a. There is a significant inverse relationship between seventh grade students' intelligence and the degree of

improvement in recognizing writing errors in their compositions after practice in typewriting their language arts assignments.

2b. There is a significant inverse relationship between seventh grade students' reading achievement and the degree of improvement in recognizing writing errors in their compositions after practice in typewriting their language arts assignments.

2c. There is a significant inverse relationship between seventh grade students' quality of handwriting and the degree of improvement in recognizing writing errors after practice in typewriting their language arts assignments.

3. Seventh grade students who have practice in seeing their language arts assignments in typewritten form, reproduced exactly from their handwritten copy by someone else, recognize a significantly greater number of writing errors in their compositions than seventh grade students who have used only handwriting in their language arts assignments.

3a. There is a significant inverse relationship between seventh grade students' intelligence and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

3b. There is a significant inverse relationship between

seventh grade students' reading achievement and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

3c. There is a significant inverse relationship between seventh grade students' quality of handwriting and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

Design of Research

To gain some insight into the questions raised in this study a research plan was designed in which data could be collected under varying conditions, and analyzed. Although the three major questions are all concerned with evaluating the effect of the use of the typewriter in improving writing skills of seventh grade students, the first question does not consider a practice period while the second and third questions do. Because of the time element it was necessary to break the study down into two phases.

The first phase was designed to provide information as to whether or not students were able to recognize more writing errors in typewritten copies of their compositions than in the original handwritten form. Data were obtained from writing samples of 146 seventh grade

students with differing abilities. One-half of the compositions were reproduced in typewriting and the other half remained in original handwritten form. All students proofread their compositions and made corrections. Papers were checked for writing errors and group means compared for significant differences. Pearson product-moment correlations were computed to determine the relationship of intelligence, reading achievement, and quality of handwriting to ability to recognize errors in the two situations.

The second phase of the study was designed to indicate the effect of practice involving use of the typewriter for a period of twelve weeks. One hundred and two seventh grade students were divided into three groups, two experimental groups and one control group. Students in one experimental group wrote their language arts assignments in typewriting. Students in the second group wrote their language arts assignments in handwriting and then their papers were copied for them in typewriting. Students in the control group wrote their language arts assignments in handwriting. All students did the same assignments and proofread each assignment. Pre- and post-writing tests were given and scores compared for significant differences among groups. Correlations were computed to determine the relationship of intelligence, reading achievement, and quality of handwriting to degree of improvement under each condition.

A more complete description of procedures used in Phase I and Phase II is presented later in this chapter.

Setting and Population

The study was conducted at Roosevelt Junior High School in Eugene, Oregon. The school is one of eight junior high schools in a district serving approximately 21,000 students. Roosevelt Junior High School enrolls approximately 850 students in grades seven, eight, and nine.

Although located in an immediate area of comfortable and modest homes, the school serves a larger geographical area with a wide range of social, economic, and educational interests. The school is influenced by its proximity to the University of Oregon and there is considerable contact between the two institutions. A number of University of Oregon teachers in training do student teaching at Roosevelt Junior High School. Many parents in the community are interested in education and hold high expectations for students. The over-all mean on most educational measures is above average.

This particular school and group of students were chosen for the study for several reasons. An important factor was that teachers and administrators were interested in such a study and willingly agreed to participate. The schedule and physical arrangement of the building was ideal. All students were assigned to block-of-time classes in which three periods (approximately three hours) were spent with one teacher in one room. During this time, instruction was given in the language arts and social studies. Seventh grade home rooms where block-of-time classes were held were located near the typewriting room. Flexibility

of time and room scheduling permitted the necessary arrangement of classes for the study.

The characteristics of Roosevelt Junior High School enrollment seemed suitable for testing the investigator's hypotheses. Students ranged widely in intellectual ability, reading achievement, and quality of handwriting. They were not used to rigidity either in schedules or teaching techniques so a new experience was not expected to be threatening in any way.

The study required the collection of two kinds of data, thus necessitating two independent groups of students. To provide adequate numbers of subjects all seventh grade students participated in the study, with the exception of those who had had previous typewriting experience. Students in the ten class sections were divided into two groups. Six sections were grouped together as subjects for Phase I and four sections were the subjects for Phase II (Table 1).

Class sections in this school are generally composed of heterogeneous groups of students. However, students with special learning problems are assigned to particular classes. Foreign language students also tend to be in the same class sections because of similarity of schedules. To assure a wide distribution of student abilities in both Phase I and Phase II of the study, a preliminary investigation was made of exceptions to heterogeneous groupings of students. Class sections were then assigned to groups to provide similar distributions of intelligence, reading achievement, and quality of handwriting in each group.

TABLE 1

PHASE I AND II

DISTRIBUTION OF STUDENTS IN CLASS SECTIONS

	Class section	Number of students
Phase I	7^1	33
	7^2	30
	7^3	30
	7^4	32
	7^7	10
	7^8	11
	Total	146
Phase II	7^5	24
	7^6	30
	7^9	18
	7^{10}	30
	Total	102

Five block-of-time teachers and one typewriting teacher cooperated in the study. All teachers were experienced junior high school teachers with years of experience ranging from three to more than twenty.

Phase I

The first part of this study was designed to provide information as to whether or not students were able to recognize more writing errors

when their compositions were typewritten than when they were handwritten. In addition, Phase I sought to determine the influence of certain variables--intelligence, reading achievement, and quality of handwriting--upon students' recognition of writing errors.

Procedure for Collecting Data

To provide data for this phase of the study, students were given two writing tasks, creative writing and expository writing. Two writing tasks were assigned to sample a wider range of students' writing ability and to assure an adequate quantity for analysis. The first writing task was to complete an unfinished story (Appendix A). Teachers presented the writing assignment as a regular lesson and students were unaware that their efforts were to be used in a study. After the introduction and discussion of the assignment, students worked individually under the supervision of the teacher. When papers were completed they were collected and given to the investigator. There was no contact between students and the investigator at any time.

Papers from each class were randomly assigned to two groups. To do this, a set of papers was scattered by holding them high and allowing them to drift where they might. Then they were picked up and dealt into two stacks. One stack was designated as Group A and the other as Group B. This procedure was followed in dividing papers from each class (Table 2).

Papers in Group A were reproduced in typewriting exactly as students had written them. Papers in Group B remained in original form.

TABLE 2

PHASE I

DISTRIBUTION OF STUDENTS IN GROUPS

Class section	Number of Students	
	Group A Typewritten Papers	Group B Handwritten Papers
7^1	16	16
7^2	16	16
7^3	15	15
7^4	16	16
7^7	5	5
7^8	5	5
Total	73	73

The typewritten papers of Group A and the original papers of Group B were passed back to the students by the teacher in a regular class session. Students were asked to circle any errors and write the corrections directly above them. Papers were then collected.

In the second writing task, students were asked to write about a travel poster. They could describe the poster, give their impression of the country, or tell why they thought the airline chose that particular picture for advertising purposes. Students wrote under the same conditions as in the first writing task. Papers in Group A were typewritten and papers in Group B remained in original form. During a subsequent class period students followed the same procedure in proofreading and correcting their compositions. All student work was directed by the teacher and performed under normal classroom conditions.

Procedure for Coding and Quantifying Errors

The writing samples to be used for the study consisted of the first fifty words written by each student on each of the two compositions, making a total of 100 words. Samples from two students were disqualified because they were less than the number of words required. Papers were carefully checked by the investigator following guidelines established by the classroom teachers and the investigator to define errors in capitalization, punctuation, sentence structure, grammar, and spelling (Appendix C). Errors were recorded on the Student Record Sheet I (Appendix D). Scores were computed by subtracting the errors recognized by students from the total number of errors found on the papers by the scorer.

Reliability of the checking procedure was tested. Writing samples of two class sections (47 students) were copied by Xerox process. The investigator first scored all the original papers and then the copies. A correlation of scores on the original set of papers and the set of copies was computed using the method described by Garrett (1966, p. 143) for calculating the coefficient of correlation from raw data. A coefficient of .96 was found between the two sets of scores.

Analysis of Data

Total scores of all errors made by students in Group A and Group B were computed. Subtotal scores according to type of error made--capitalization, punctuation, sentence structure, grammar, and

spelling--were also computed for each group. Means of the total score for each group and means of scores for each type of error for each group were computed and compared by analysis of variance.

Students' scores were further analyzed to determine relationships between scores in the two groups and individual differences of students. Pearson product-moment correlations were computed for each group between students' scores and intelligence, reading achievement, and quality of handwriting. Correlations were tested for significance. An IBM 360/50 computer was employed for computations.

Phase II

The second part of this study was designed to provide data concerning the effect of two kinds of practice on students' ability to recognize composition errors. In addition, the study sought the relationship of intelligence, reading achievement, and quality of handwriting to students' degree of improvement resulting from each kind of practice.

Procedure for Collection of Data

Students from four class sections participated in Phase II of the study. Two language arts teachers and one typewriting teacher were involved as instructors. All student work was under the direction of the teachers. There was no contact between students and the investigator during the study.

A pretest of students' ability was made at the beginning of the

study by asking students to perform two writing tasks. The first consisted of writing an ending for an unfinished story (Appendix A). The writing was performed during a regular class period and students were not aware that their work was to be considered a test. Students were allowed to discuss the story during the introductory part of the lesson, but all writing was done individually during the period under the supervision of the teacher. Papers were handed in before students left the room. On the following day papers were passed back to the students by the teacher and they were asked to circle errors and write the corrections above. After doing this, papers were passed in.

On subsequent days the same procedure was followed with the writing assignment pertaining to a travel poster. Students were asked to write a description of the poster, give their reaction to it, or tell why they thought the airline chose that particular picture to advertise the country. Writing was again passed in and corrections made by the students the following day.

The study was designed to include a practice period of twelve weeks and then gather similar data from which to evaluate the effect of the two kinds of practice. Students in each of the four class sections were randomly assigned to three groups, X, Y, and Z. This was accomplished by assigning every third name on alphabetized class-lists to Group X, the names following X's to Group Y, and the remaining students to Group Z (Table 3). Fifteen students who had had previous training in typewriting were not included in the study. One other student was disqualified because he did not write the designated number of words. Another student moved away before the end of the study.

TABLE 3

PHASE II

DISTRIBUTION OF STUDENTS IN GROUPS

Class section	Group X Experimental[1]	Group Y Experimental[2]	Group Z Control
7^5	9	8	7
7^6	10	11	9
7^9	6	6	5
7^{10}	10	9	12
Totals	35	34	33

Experimental[1]--Prepared assignments in typewriting

Experimental[2]--Handwritten assignments copied in typewriting

Group X spent a minimum of two full class periods per week in a special typewriting class where students prepared their regular language arts assignments. At the beginning of the practice period, however, this group went to the typewriting room every day for eleven consecutive school days to learn the typewriter keyboard. During these eleven periods the typewriting teacher presented the keyboard and provided appropriate drills for mastery. After the initial period of keyboard instruction, the time in the typewriting room was spent preparing language arts assignments. Instruction was limited to that which students needed to accomplish the writing assignment.

Group Y remained in the regular classroom and prepared the language arts assignments in handwriting. Their papers were then reproduced in typewriting exactly as they had been written and handed

back to them the next day for proofreading and correcting.

Group Z served as the control group, remaining in the classroom and doing the regular written assignments in handwriting. They also proofread their handwritten papers.

All students in the four classes were given the same language arts instruction and assignments before Group X went into the typewriting room. Writing assignments, planned cooperatively by the two classroom teachers, were an outgrowth of regular class experiences. Assignments included:

Classification of sentences,
Capitalization,
Forming possessives,
Contractions,
Onomatopoeia,
Prefixes, suffixes, and roots,
Business letters,
Informal friendly letters,
Answering questions about a story,
Explaining literary terms,
Expository paragraphs, and
Creative writing.

At the end of the twelve weeks, all students were given two writing tasks as a posttest, similar to those at the beginning of the study. In the first task students wrote an ending to an unfinished story (Appendix B). The following day they proofread their stories and made corrections by circling errors and writing the corrections above. On subsequent days the same procedure was followed in writing about a travel poster.

Procedure for Coding and Quantifying Errors

The first fifty words of each paper were used as the writing

sample for each student, making a total of 100 words. Papers were carefully checked by the investigator according to the guidelines established by the teachers and the investigator to define errors in capitalization, punctuation, sentence structure, grammar, and spelling (Appendix C). Errors were recorded on the Student Record Sheet II (Appendix E) and students' scores obtained by subtracting the number of errors recognized by the students from the total number of errors found by the investigator. Pretest and posttest scores for each student were compared and a net gain score calculated.

Analysis of Data

The sum of students' net gain scores in each of the Groups X, Y, and Z were computed. Subtotals of net gain scores for each were also computed according to type of error made--capitalization, punctuation, sentence structure, grammar, and spelling. Analysis of variance was used to compare net gain scores and to determine difference among the scores of groups.

Students' net gain scores were further analyzed to determine relationships between scores in the three groups and individual differences of students. Pearson product-moment correlations were computed between students' net gain scores and intelligence, reading achievement, and quality of handwriting in each group. Correlations were tested for significance. An IBM 360/50 computer was employed for computations.

Research Instruments

Samples of students' writing provided data for this study. This

was essential as the study was designed to provide data as to whether or not typewriting facilitated students' ability to recognize errors in their compositions. Additional data were obtained from the California Short-Form Test of Mental Maturity, Gates Reading Survey, and the Ayres Handwriting Scale.

The California Short-Form Test of Mental Maturity, S-Form, was used to measure the variable of intelligence, and the Gates Reading Survey was used to measure reading ability. These standardized tests are regularly given to seventh grade students in Eugene and scores were made available to the investigator. Because of the tests' reliability in their respective fields of educational measurement, they were considered adequate for the purposes of this study.

The Ayres Handwriting Scale was used to measure students' handwriting. This scale was used because it is based on legibility and offers adequate comparisons of writing specimens for reasonably accurate scoring.

Limitations of the Study

1. The limited population used in this study does not permit generalizations to a larger population, although the reader may conclude that the data obtained permit some tentative conclusions.

2. Evaluation of students' writing was based on their ability to detect and correct specified errors in their compositions (Appendix C). No attempt was made to evaluate other aspects of qualitative improvement.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This chapter presents the statistical findings of the study. It includes data gathered from each group and results of statistical procedures used in analyzing the data.

After students' writing samples had been collected and scored, information about each subject was coded and punched on standard IBM data cards. A compilation of the raw data can be found in Appendix F. Statistical analyses were conducted by the Statistical Laboratory and Computing Center of the University of Oregon using the IBM 360/50 computer.

Following the design of the research procedure discussed in the previous chapter, statistical findings are presented in two parts. Findings in Phase I of the study present an analysis of data related to the first hypothesis and related subhypotheses, and findings in Phase II present an analysis of data related to the second and third hypotheses and related subhypotheses.

Statistical Findings in Phase I

The hypothesis and subhypotheses stated as a basis for research in Phase I were:

1. Seventh grade students recognize a significantly greater number of their writing errors when their compositions are

typewritten than when they are handwritten.

1a. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their intelligence.

1b. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their reading achievement.

1c. Seventh grade students' ability to recognize a significantly greater number of writing errors in typewritten copies of their compositions than in their original handwritten compositions is inversely related to their quality of handwriting.

Students in six seventh grade language arts class sections were randomly assigned to two groups, A and B. There were 73 students in each group, with a total of 146 students. All students produced writing samples as described previously. Papers of students in Group A were reproduced in typewriting before being proofread by the students for writing errors. Students in Group B proofread for writing errors from their original handwritten papers.

Papers were checked and the total number of errors made in capitalization, punctuation, sentence structure, grammar, and spelling were counted. A count was also made of the number of errors recognized and

corrected by the students during proofreading. Scores of individual students were computed by subtracting the number of errors recognized and corrected by the students from the total number of errors found by the investigator. Means of scores and standard deviations of means were computed for each group (Table 4).

TABLE 4

PHASE I

SUMMARY OF MEAN SCORES

	Group A		Group B	
	Mean	SD	Mean	SD
Capitalization	1.945	3.527	1.589	2.847
Punctuation	2.438	2.708	2.507	4.000
Sentence Structure	1.699	1.808	1.808	1.970
Grammar	1.384	1.655	1.247	1.913
Spelling	2.822	3.259	3.288	4.067
Total	10.288	8.869	10.480	10.118

One-way analysis of variance was used to compare the means of the two groups. A mean square variance of 1.340 between sets and 90.508 within sets was found. The resulting F ratio of 0.015 was not significant. Therefore, hypothesis #1 was rejected.

To test the subhypotheses, students' scores on the California Test of Mental Maturity, Gates Reading Survey, and Ayres Handwriting Scale were obtained for each group. These data are summarized in Table 5. Graph 1 (p. 41) presents the distribution of intelligence quotients, Graph 2 (p. 42) presents the distribution of reading achievement scores, and Graph 3 (p. 43) presents the distribution of handwriting scores for each group.

TABLE 5

PHASE I

SUMMARY OF TEST DATA

	California Test of Mental Maturity		Gates Reading Survey		Ayres Handwriting Scale	
	Range	Mean	Range	Mean	Range	Mean
Group A	80-142	114.0	2.9-12.0	8.0	20-90	43.7
Group B	86-143	117.7	2.3-12.2	8.2	20-90	41.5

Pearson product-moment correlations were computed between writing scores and the three variables of intelligence, reading achievement, and quality of handwriting (Table 6). Coefficients were tested and found to be significant between total scores and the three variables for both Group A and Group B. A coefficient of .302 was required for significance at the .01 level. Group A exceeded this point with a coefficient of-.512 for intelligence, -.606 for reading achievement, and -.398 for handwriting. Group B exceeded the .01 level of significance with a coefficient of -.512 for intelligence and -.606 for reading achievement. A coefficient of -.292 in handwriting exceeded the necessary .232 for significance at the .05 level.

Correlation coefficients for Group A and Group B were compared to determine whether or not differences between the two groups were significant. Coefficients of -.512 between intelligence and total score and -.606 between reading achievement and total score were identical for both groups. The coefficients of -.398 between handwriting and total score for Group A was not significantly higher than the coefficient of -.292 between handwriting and total score for Group B.

TABLE 6

PHASE I

CORRELATIONS OF WRITING SCORES AND INDIVIDUAL DIFFERENCES IN INTELLIGENCE, READING ACHIEVEMENT, AND HANDWRITING

	Group A			Group B		
	I.Q.	Reading	Hand-writing	I.Q.	Reading	Hand-writing
Capitalization	-.388**	-.422**	-.311**	-.373**	-.329**	-.088
Punctuation	-.204	-.206	-.211	-.198	-.296*	-.219
Sentence Structure	-.333**	-.396**	-.240*	-.338**	-.372**	-.158
Grammar	-.504**	-.547**	-.218	-.394**	-.512**	-.016
Spelling	-.364**	-.524**	-.327**	-.463**	-.566**	-.360**
Total	-.512**	-.606**	-.398**	-.512**	-.606**	-.292*

*Significant at .05 level

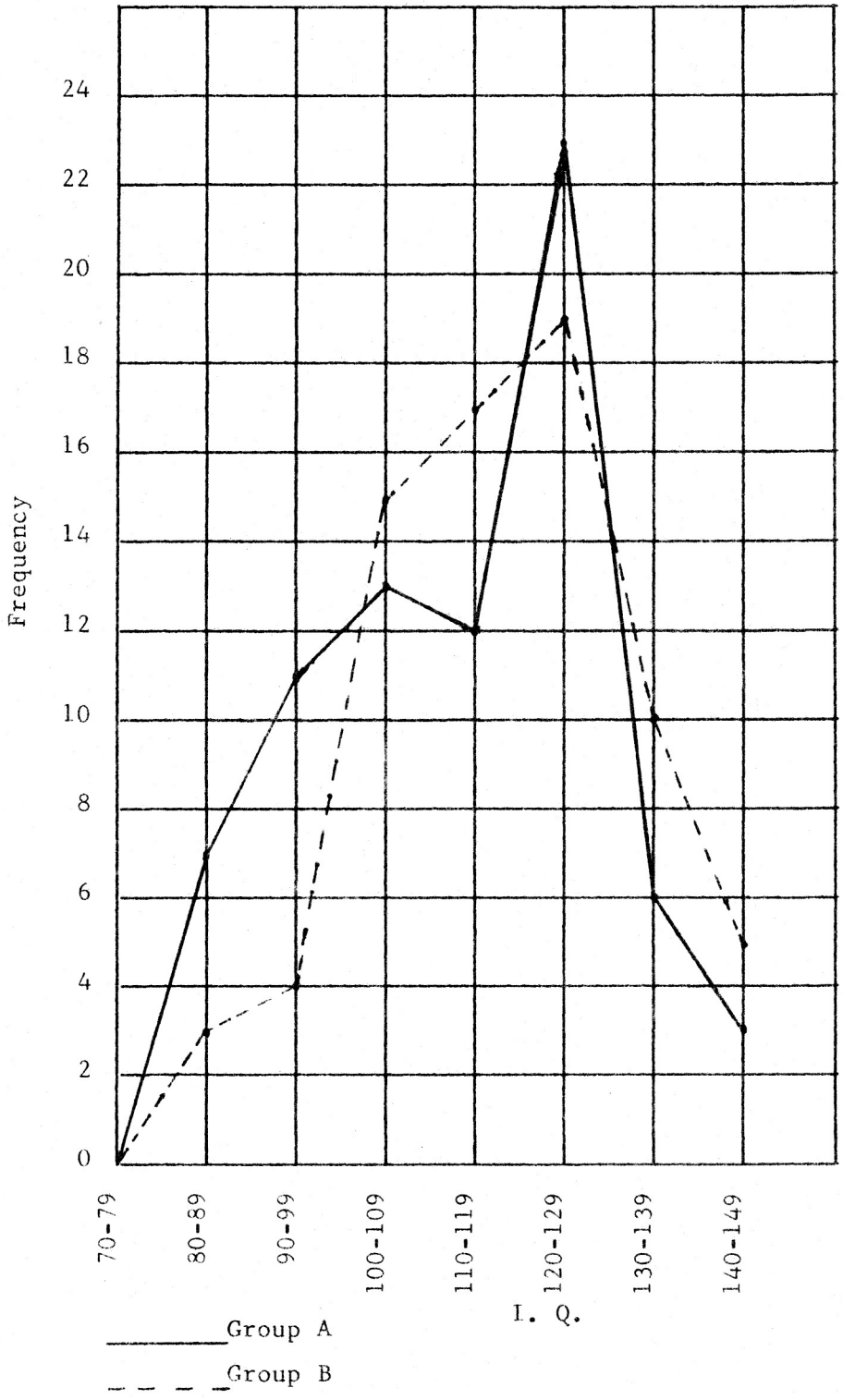
**Significant at .01 level

Even though significant correlations were found between ability to recognize writing errors and high scores in intelligence, reading achievement, and quality of handwriting for students in both Group A and Group B, correlations were not significantly higher for Group A than for Group B. Therefore, subhypotheses 1a, 1b, and 1c were rejected.

GRAPH I

PHASE I

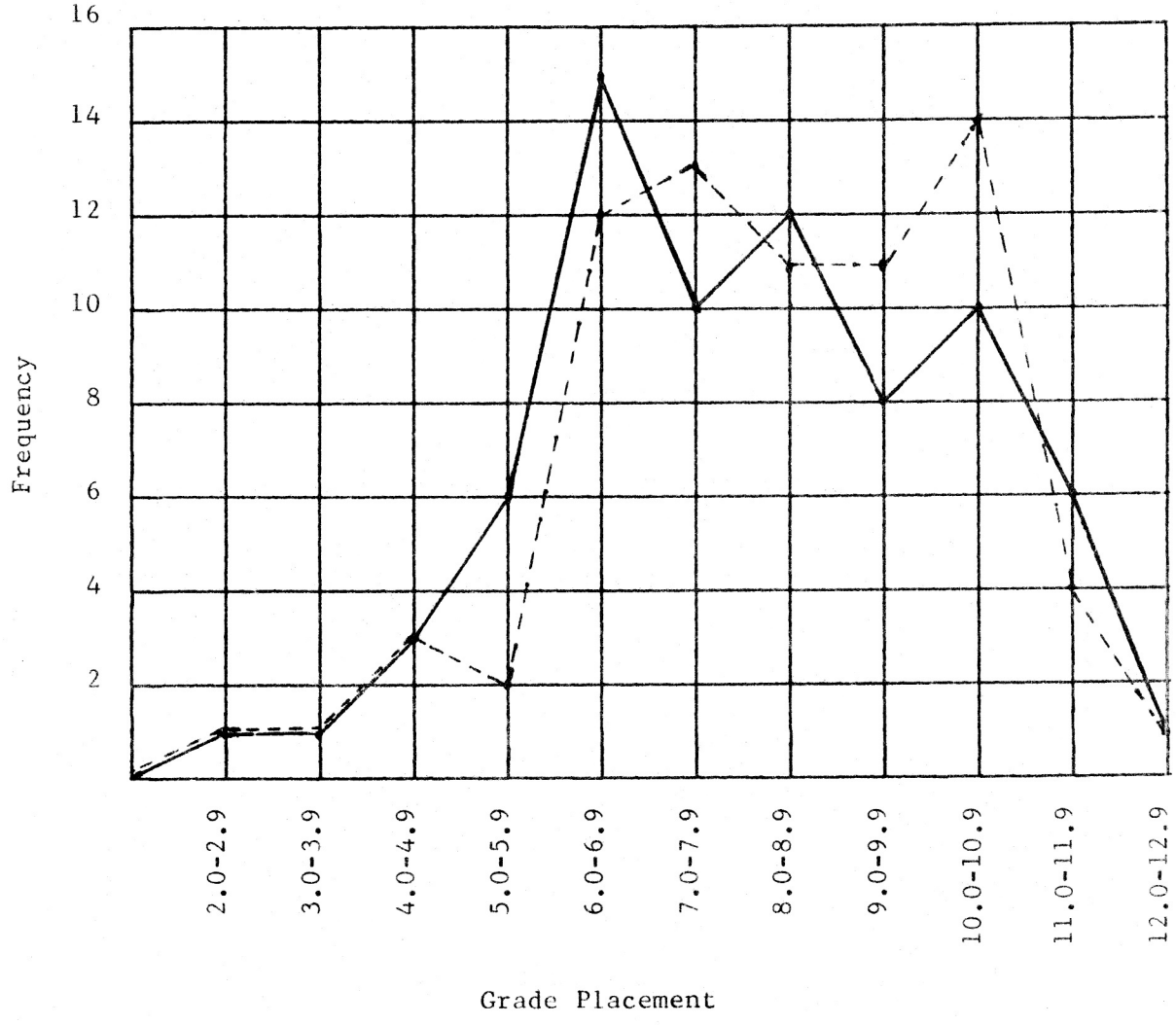
DISTRIBUTION OF INTELLIGENCE QUOTIENTS
CALIFORNIA TEST OF MENTAL MATURITY



GRAPH 2

PHASE I

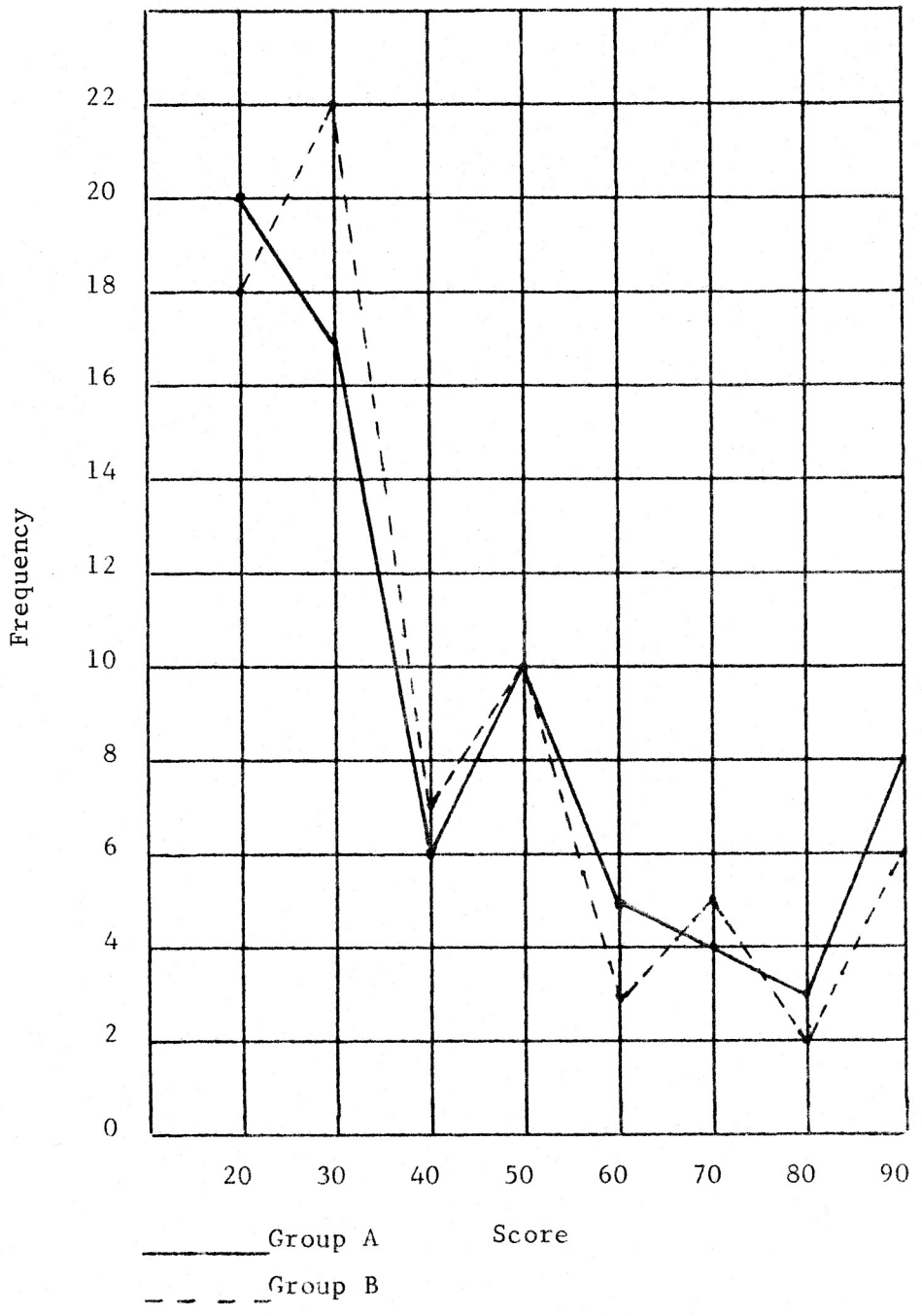
DISTRIBUTION OF SCORES
GATES READING SURVEY



GRAPH 3

PHASE I

DISTRIBUTION OF SCORES
AYRES HANDWRITING
SCALE



Statistical Findings in Phase II

Collection and analysis of data in Phase II focused on the following hypotheses and subhypotheses:

2. Seventh grade students who have practice in typewriting their language arts assignments recognize a significantly greater number of writing errors in their compositions than seventh grade students who have used only handwriting in their language arts assignments.

   2a. There is a significant inverse relationship between seventh grade students' intelligence and the degree of improvement in recognizing writing errors in their compositions after practice in typewriting their language arts assignments.

   2b. There is a significant inverse relationship between seventh grade students' reading achievement and the degree of improvement in recognizing writing errors in their compositions after practice in typewriting their language arts assignments.

   2c. There is a significant inverse relationship between seventh grade students' quality of handwriting and the degree of improvement in recognizing writing errors after practice in typewriting their language arts assignments.

3. Seventh grade students who have practice in seeing their language arts assignments in typewritten form, reproduced exactly from their handwritten copy by someone else, recognize

a significantly greater number of writing errors in their compositions than seventh grade students who have used only handwriting in their language arts assignments.

3a. There is a significant inverse relationship between seventh grade students' intelligence and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

3b. There is a significant inverse relationship between seventh grade students' reading achievement and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

3c. There is a significant inverse relationship between seventh grade students' quality of handwriting and the degree of improvement in recognizing writing errors in their compositions after practice in seeing their handwritten language arts assignments reproduced in typewritten form by someone else.

Students in four language arts class sections were randomly assigned to three groups, X, Y, and Z for a period of twelve weeks. Students in Group X prepared assignments at the typewriter, students in Group Y prepared their assignments in handwriting and their papers were then

reproduced in typewriting for them, and students in Group Z, serving as the control group, prepared their assignments in handwriting. Students provided both pre- and post-writing samples in which they had been asked to proofread for writing errors and make needed corrections. Papers were checked and a count made of the number of errors recognized and corrected by the students and the total number of errors found by the investigator. Scores were computed by subtracting the number of errors recognized from the total number of errors made. A net gain score was then computed by subtracting the pre-practice score from the post-practice score. Means of net gain scores and standard deviations of means were computed for each group (Table 7).

TABLE 7

PHASE II

SUMMARY OF MEANS
NET GAIN SCORES

	Group X		Group Y		Group Z	
	Mean	SD	Mean	SD	Mean	SD
Capitalization	1.229	2.353	0.735	1.831	0.060	1.580
Punctuation	-0.286	3.494	-1.647	3.813	-1.788	3.140
Sentence	0.943	1.765	0.676	1.532	0.364	1.517
Grammar	0.143	1.240	-0.029	2.081	0.121	1.781
Spelling	1.314	2.529	1.294	2.612	0.212	3.586
Total	3.171	5.670	1.147	5.668	-0.727	6.797

One-way analysis of variance was computed for the three groups using net gain scores for students in each group. A mean square variance

of 129.286 between groups and 36.685 among groups was found. For two and ninety-nine degrees of freedom, respectively, the resulting F ratio of 3.524 was significant.

The t test was then applied to determine which means were significantly different. A difference of 3.866 between means was necessary for significance at the .01 level. The difference between the means of Group X and Group Z met this requirement with a difference of 3.898. The difference between the means of Group Y and Group Z was 1.864, less than the required difference of 2.945 for significance at the .05 level. Therefore, hypothesis #2 was accepted as there was a significant difference between Group X and Group Z. Hypothesis #3 was rejected as there was no significant difference between Group Y and Group Z.

To test the subhypotheses related to hypotheses #2 and #3, students' scores on the California Test of Mental Maturity, Gates Reading Survey, and Ayres Handwriting Scale were obtained for each group. These data are summarized in Table 8.

TABLE 8

PHASE II

SUMMARY OF TEST DATA

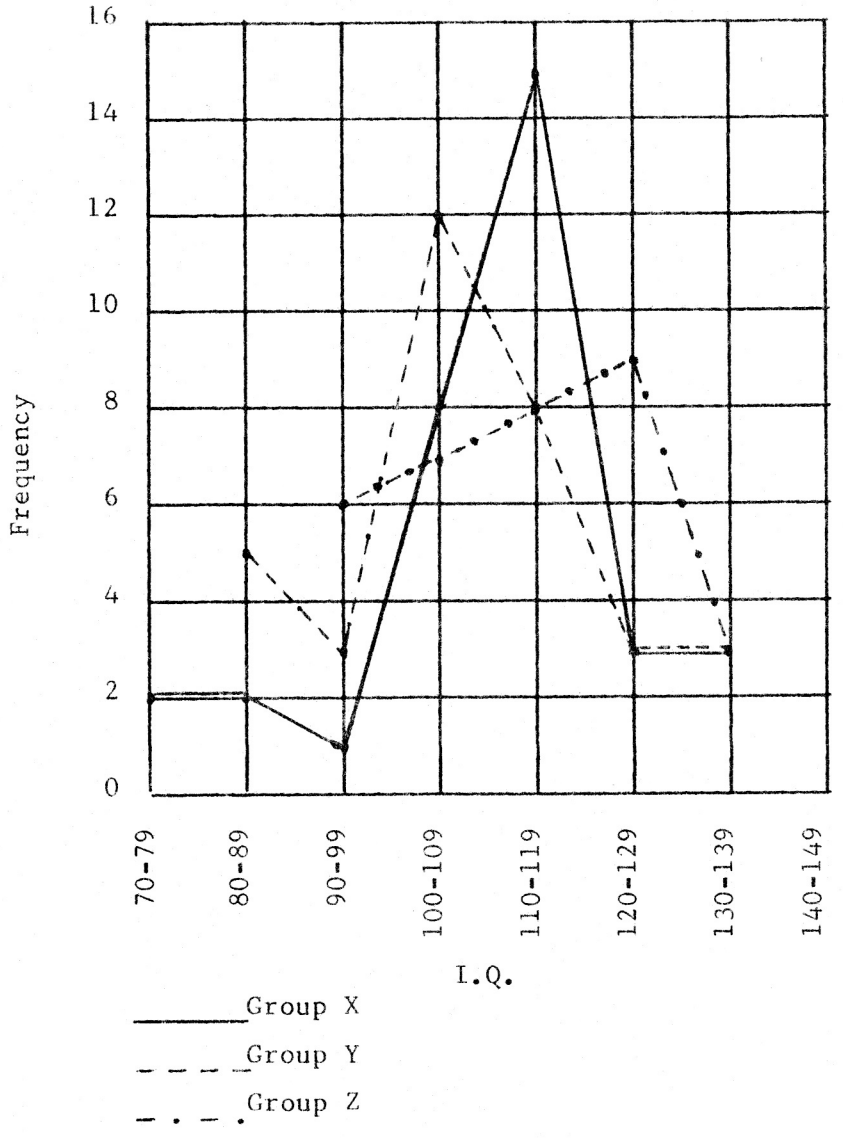
	California Test of Mental Maturity		Gates Reading Survey		Ayres Handwriting Scale	
	Range	Mean	Range	Mean	Range	Mean
Group X	73.138	110.8	4.6-11.0	7.6	20-80	41.4
Group Y	83.134	107.9	4.6-10.3	7.4	20-90	50.3
Group Z	92.137	113.8	4.5-11.3	7.7	20-90	52.1

Graph 4 (p. 49) presents the distribution of intelligence quotients, Graph 5 (p. 50) presents the distribution of reading achievement scores, and Graph 6 (p. 51) presents the distribution of handwriting scores for each group.

GRAPH 4

PHASE II

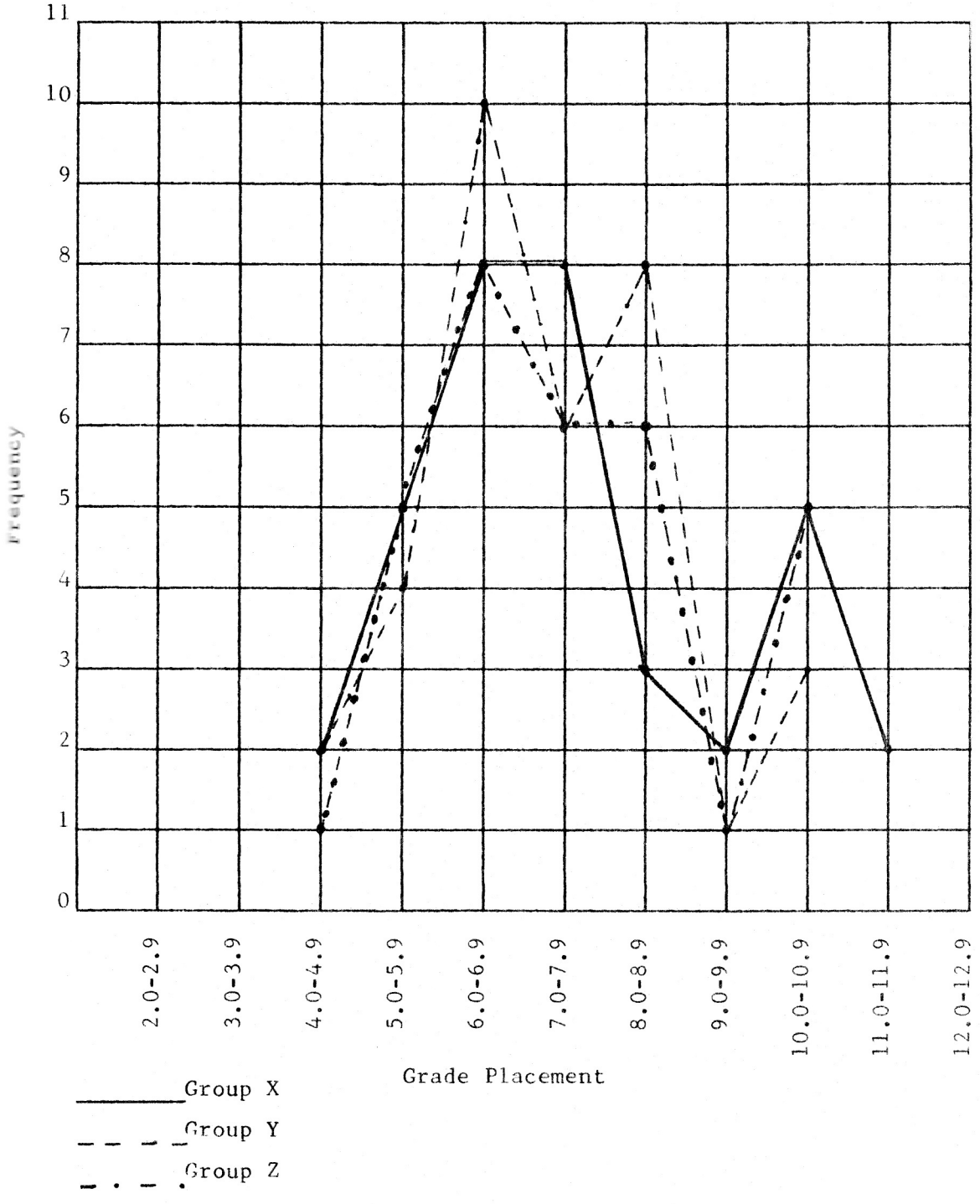
DISTRIBUTION OF INTELLIGENCE QUOTIENTS
CALIFORNIA TEST OF MENTAL MATURITY



GRAPH 5

PHASE II

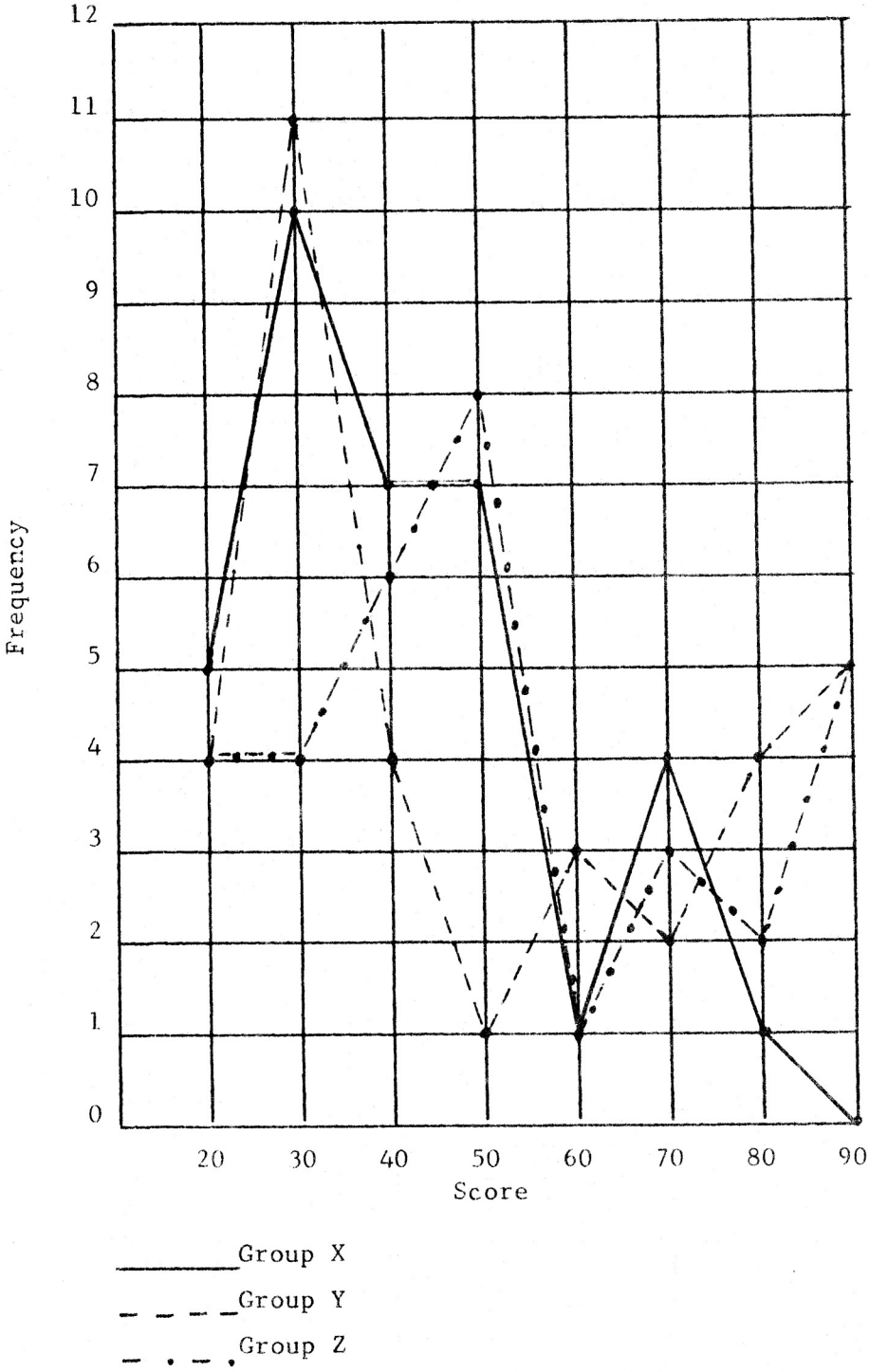
DISTRIBUTION OF SCORES
GATES READING SURVEY



GRAPH 6

PHASE II

DISTRIBUTION OF SCORES
AYRES HANDWRITING
SCALE



Pearson product-moment correlations were computed between writing scores and the three variables of intelligence, reading achievement, and quality of handwriting. A coefficient of .449 was necessary for significance at the .01 level and a coefficient of .349 at the .05 level. The only factors reaching a significant correlation at the .05 level were capitalization and handwriting for students in Group Z (Table 9).

TABLE 9

PHASE II

CORRELATIONS OF NET GAINS SCORES AND INDIVIDUAL DIFFERENCES IN INTELLIGENCE, READING ACHIEVEMENT, AND HANDWRITING

	Group X			Group Y			Group Z		
	I.Q.	Read-ing	Hand-writ-ing	I.Q.	Read-ing	Hand-writ-ing	I.Q.	Read-ing	Hand writ-ing
Capitaliza-tion	-.312	-.241	-.039	-.165	-.007	-.031	.196	.040	-.393*
Punctua-tion	-.225	-.108	-.039	.284	.302	.071	-.094	.023	-.185
Sentence Structure	-.230	-.026	-.030	.002	-.042	-.107	.014	.017	.067
Grammar	-.036	-.196	.234	.152	.282	.207	.183	.090	.109
Spelling	-.191	-.213	-.272	.009	-.115	-.194	.149	-.028	-.284
Total	.039	-.144	-.204	.160	.233	-.021	.148	.102	-.260

*significant at .05 level

On the basis of these correlations, subhypotheses 2a, 2b, 2c, 3a, 3b, and 3c were rejected as significant relationships were not found.

CHAPTER V

SUMMARY AND CONCLUSIONS

This study developed from a concern for the writing abilities of students. It was designed to determine the influence of the typewriter in improving writing skills. The possible value of reproducing students' work in typewritten form, by someone else as well as by the students themselves, was explored. The study further sought to determine whether or not students with certain individual differences would receive greater benefit from utilization of the typewriter in language arts classes. Individual differences in intelligence, reading achievement, and handwriting were considered.

The population for this study consisted of two hundred and forty-eight seventh grade students in ten language arts class sections. One hundred and forty-six students participated in Phase I of the study and one hundred and two students in Phase II. Six teachers directed the activities of students during the study, five block-of-time teachers and one typewriting teacher.

The study was basically concerned with three questions, 1) Do students recognize more writing errors when their compositions are typewritten than when they are in their own handwriting, 2) Does practice in typewriting their own language arts assignments facilitate students' recognition of writing errors in compositions, and 3) Does practice in seeing their language arts assignments that have been reproduced in

typewriting by someone else facilitate students' recognition of writing errors in compositions? To answer these questions the research was broken down into two phases due to the time element involved. For the sake of clarity the results of the two phases are presented separately.

Phase I

In Phase I students were given writing assignments to provide samples of their work. Papers from students were randomly assigned to two groups, A and B. Papers in Group A were reproduced in typewriting exactly as the students had written them, and papers in Group B remained in original handwritten form. All students were asked to proofread their papers and make corrections. Papers were then scored and data computed and analyzed for significant differences between means. Product-moment correlations were also computed between individual students' scores on the writing assignments and intelligence, reading achievement, and quality of handwriting.

Major Findings

1. Students who proofread typewritten copies of their compositions did not recognize a significantly greater number of writing errors than students who proofread their original handwritten compositions.

2. A relationship between ability to recognize writing errors and intelligence, reading achievement, and quality of handwriting was found to be significant in proofreading both typewritten and handwritten compositions.

Discussion

It was hypothesized that typewriting students' compositions would facilitate recognition of writing errors. It was thought that students would tend to be more objective when they were proofreading a paper mechanically printed rather than in their own familiar handwriting. Statistical evidence in this study did not indicate this to be true.

It was further hypothesized that students with lower test scores in intelligence, reading achievement, and handwriting, would especially benefit from seeing their compositions in typewritten form. The results of the study did not support this hypothesis. However, highly significant correlations between writing ability and intelligence, reading achievement and quality of handwriting indicated a relationship among these factors for both typewritten and handwritten compositions.

Phase II

Phase II was designed to provide data concerning the effect of typewriting practice by the students themselves, and the effect of regularly seeing their handwritten papers reproduced in typewriting by someone else, on students' writing errors. At the beginning of the study, students were given writing assignments to provide samples of their work. Students in each class section were randomly assigned to three groups, X, Y, and Z. All students were given the same writing assignments and asked to proofread each assignment. Students in Group X prepared their language arts assignments in typewriting, students in

Group Y prepared their language arts assignments in handwriting and papers were then reproduced in typewriting by someone else, while students in Group Z, serving as the control group, prepared their assignments in handwriting. At the end of a twelve weeks practice period, students were again asked to provide writing samples and proofread them for errors. Pre- and post-writing samples were compared for net gain. Means for each group were computed and compared to determine significant differences. Product-moment correlations were also computed between individual students' net gain scores in writing and intelligence, reading achievement, and handwriting.

Major Findings

1. Students who had practice in preparing and proofreading their language arts assignments in typewriting made a significantly greater gain in writing skills than studentswho routinely prepared and proofread their language arts assignments in handwriting. Gain in writing skill was found to be significant at the .01 level.

2. Students who had practice in seeing and proofreading their language arts assignments reproduced in typewritten form by someone else, did not make significantly greater gain in writing skill than students who routinely prepared and proofread their language arts assignments in handwriting.

3. There was no significant relationship between net gain in writing skill resulting from either type of practice and individual differences in intelligence, reading achievement, or quality of handwriting.

Discussion

It was hypothesized that students would gain in writing skills both from actual practice in typewriting their language arts assignments and also from seeing their handwritten language arts assignments reproduced in typewritten form. It was felt that the typewritten form would facilitate objectivity and increase students' awareness of writing errors.

Statistical findings of this study indicated that students who prepared their language arts assignments at the typewriter did make significantly greater gains in writing skills than students who routinely prepared their language arts assignments in handwriting. However, merely seeing assignments in typewritten form, reproduced by someone else, seemed to have little influence in improving writing skills.

It was further hypothesized that students with lower test scores in intelligence, reading achievement, and quality of handwriting, would especially benefit from the two kinds of practice. The results did not indicate that this is true. The findings suggest that benefit from typewriting is not limited to students with lower abilities, but that typewriting practice facilitates growth in writing skills for students of varying abilities. There was no indication that seeing their assignments reproduced in typewriting by someone else, was of value in improving writing skills for any group of students.

Implications of the Study

The findings of this study indicate that typewriting in the

seventh grade language arts program facilitates the awareness of errors in students' compositions. Considering the limitations in the scope of the study, both in population and duration of the practice period, additional studies focused on the teaching of typewriting as an integral part of the language arts program in the junior high school are needed. Questions raised include: Does continued typewriting practice in the context of the language arts program facilitate a steady growth in writing skills or is maximum improvement achieved in a given period of time? What procedures and instruction are needed to best utilize language arts time allotted for typewriting?

In addition to these questions directly related to typewriting, the significant correlations found between individual differences and writing ability also indicates a need for further study. Considerable attention has already been given to the relationship between intelligence and reading achievement to academic success. However, there appears to be little evidence of concern for improving students' handwriting. The significant relationship between quality of handwriting and students' ability to recognize writing errors seems to indicate a need for greater emphasis on legibility of handwriting in today's language arts curriculum.

In seeking to improve the language arts program in the junior high school it seems that current practices and materials used in teaching typewriting need to be evaluated. Should typewriting instruction be integrated into the total language arts program rather than being taught as a separate subject? The findings of this study indicate the positive value of including typewriting in the language arts curriculum as an aid in developing awareness of writing errors.

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APPENDIX A

UNFINISHED STORY

Into Streamtime

The machine looked simple enough. There were two chairs, some wires that looked like bedsprings, and a numbered dial attached to a box. The device rumbled and pulsed with an on-off, on-off glow.

"It looks sick to me," Connie said. "I think it's got indigestion."

Vern snorted. "Forget the looks. I'll admit it seems more like a jukebox than a scientific marvel, but my calculations say it will work."

"How?"

"I won't strain your brain with details. Right now all we have to do is sit down, set the dial to the year in time we want, and we're off. All set?"

"I guess so, but I hear a big inner voice yelling NO. Suppose we end up in the middle of a battle or something? Can we tell <u>where</u> we're going?"

"Unfortunately, no. However, I can simply squeeze this buckle on my belt to bring us home again. Of course, the machine may take about 60 seconds to start work."

"Swell! What happens meanwhile?"

"We won't know that until we get out of the stream of time and see. You twist the dial, and I'll press the 'go' button on my chair."

"I always thought I was nuts, and this proves it." Connie reached for the dial and gave it a twist. . . .

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APPENDIX B

UNFINISHED STORY

The Old Barn

The old ramshackle barn in the field behind the school had everything you could imagine in it--a Model T Ford, a bear trap, and, according to some people, even a coffin in the loft.

Imagining was all the kids at Wilton Junior High could do, though. The owner, Mr. Jordon, had posted a No Trespassing sign on the barn, and the school had a rule that any pupil who left the school grounds during lunch time would be barred from school clubs and other activities for the rest of the year.

Henry and Bill both played on the soccer team and Bill was president of the model car club. They certainly didn't want to give up those activities, but they kept thinking of the wonderful tales they'd heard about the old barn. Was there really a coffin in the loft? Was it an empty coffin?

One day during lunch their curiosity got the better of them. Consequences were, for the moment, forgotten.

"Hey, Bill, did you hear that old Mr. Jordon sprained his ankle?" asked Henry.

"Yeah. My dad talked to him over at the doctor's office yesterday and he'll be on crutches for at least two weeks. The doctor says he may have a pulled muscle," answered Bill.

"Do you know what I'm thinking, Bill? This would be a good time to see what's in that old barn of his. With him laid up with a sore leg he isn't going to be poking around that place."

"Man, you've got your thinking cap on today, Henry. Down the hatch with that lunch and let's go."

They slipped out of the school yard when no one was looking and darted across the field to the big barn. Somewhere on its weather-beaten roof a shingle flapped in the wind. Henry pulled the great creaking door open and they slipped inside. The door closed behind them and they stood there blinded by the sudden darkness. Gradually their eyes adjusted to the dim light and Bill whispered softly, "Look. Isn't that a ladder over there?"

"Where? I can't see any," answered Henry.

"There. By that crack in the wall," said Bill, taking Henry's arm and pointing. "I think it goes up to the loft."

"Yeah . . . Yeah, I'll bet it does. C'mon, let's find out," and Henry crept silently toward the crack of light with Bill close behind.

They had only taken two or three steps when they heard a soft, groaning noise. Terrified, they stood stock-still for a moment. The groaning continued.

Then the noise died away and the boys eased themselves noiselessly toward the door. "Let's get out of here," breathed Bill in terror

The noise came again, louder this time. The boys stopped dead in their tracks.

"There's someone or something alive up there," whispered Henry shakily.

"What'll we do?" Bill whispered back, trying to control his trembling jaw. "Maybe we should go up and see what's making those groans."

"I don't know," hesitated Henry. "If it's a sick animal it might be vicious."

"Yeah, or it might be somebody dangerous--maybe a robber that got shot and came in here to hide," added Bill.

"Gosh, Bill, what'll we do? We've got to do something . . . "

APPENDIX C

GUIDELINES FOR CODING AND QUANTIFYING ERRORS

CAPITALIZATION

Errors will be counted for failure to capitalize the first word in a sentence, the first word of a quotation, a proper noun, or the first and important words in titles. Capitalization needed in rewriting run-on sentences will not be counted.

Examples:

(t)he man was old. (one error)
"(c)ome into the house," he said. (one error)
The new girl's name is (j)ane. (one error)
We read "The Legend of (S)leepy Hollow." (one error)

PUNCTUATION

End punctuation. Errors will be counted for omission of punctuation at the end of a sentence or for incorrect use of a period, question mark or exclamation mark. Punctuation needed in rewriting run-on sentences will not be counted.

Examples:

The house was haunted(.) (one error)
Did you go to Sam's party(?) (one error)

Comma. Errors will be counted for omitting commas to separate things in a series, to separate items in a date or an address, to set off non-essential explanatory phrases, to separate a quotation from the rest of the sentence, to set off a noun in direct address, or to set off "yes" and "no" as answers. A comma before the conjunction in a series is optional.

Examples:

She bought oranges(,) bananas and grapes. (one error)
John was born June 12(,) 1958(,) in Florida. (two errors)
He lives in Portland(,) Oregon. (one error)
Jack(,) the boy with the dog(,) won the contest. (two errors)
Mother said(,) "I'll bake some cookies." (one error)
Mary(,) please bring me that pillow. (one error)
No(,) Martin, you may not go. (one error)

Quotation marks. Errors will be counted for omitting or misplacing quotation marks to enclose direct quotations and titles of stories and poems. One error will be counted for an error involving either a pair of quotation marks or part of a pair.

Examples:

Jordon said, O I'm going in.O (one error)
"You sing well, O Mary, O said the teacher. (one error)
We're reading O Babe, Paul Bunyan's Blue Ox. O (one error)

SENTENCE STRUCTURE

Incomplete sentence. An error will be counted for an incomplete sentence unless it is used as a stylistic device.

Examples:

Whenever I have nothing to do. (one error)
After fighting about fifteen minutes. (one error)
An avalanche! (no error)

Run-on sentence. An error will be counted for each run-on sentence. Capitals and punctuation needed for correct sentence structure will not be counted as errors.

Examples:

He knew that the big reason was Joe Flynn, because he was going steady with Barbara, and that since Joe was obviously much stronger than Jim, so he couldn't bully his way past him, even if he wanted to. (one error)
You knew we hated those guys how do you think we could have a real rumble without knives? (one error)

Lack of clarity. An error will be counted if a sentence has awkward wording or if the meaning is not clear.

Examples:

She was the last relative they had who died two years ago. (one error)
Her friends were about the only ones that she was going to be here this weekend. (one error)

Omitted, twice-written or unnecessary word. An error will be counted if a word is omitted, if the same word is written twice, or if unnecessary words are used.

Examples:

Some of the boys didn't to come to Sue's party. (one error)
They say the (the) boys behind the store. (one error)
John (he) saw the bear coming toward the tent. (one error)

GRAMMAR

Verb form. An error will be counted each time an incorrect form of a verb is used. The verb must agree with the noun number.

Examples:

He was (took) to the hospital in an ambulance. (one error)
Martha and Jill (likes) to fish with their dad. (one error)

Noun number. An error will be counted for incorrect use of singular and plural nouns. The noun number must agree with the verb.

Examples:

The speaker asked all the (gentleman) to move to the front of the auditorium. (one error)
His mother and father were both only children in their (family.) (one error)
The (bird) sing in the early morning. (one error)

Possessives. An error will be counted for using another word when a possessive is needed or for using an incorrect possessive form.

Examples:

They missed (there) bus. (one error)
The (deers') trail went right through the garden. (one error)

Word choice. An error will be counted for each incorrect use of a word.

Examples:

They found that the squeaking was from (a) old barn door. (one error)
(There) going on a picnic by the river. (one error)
I'm sure he can make up a better excuse (then) that one. (one error)

SPELLING

Errors will be counted if words are misspelled or illegible. Words broken at the end of a line must be divided between syllables. Omission or misplacement of an apostrophe in a contraction will be considered a spelling error. Writing an abbreviation when the full word should be written will be considered a spelling error. Omission of a period after an allowed abbreviation will be considered a spelling error.

Examples:

He listened for awail and then he reconized the voice. (two errors)
"Flynn would have been here sooner but he couldn't get out any earl-ier," said Lee. (one error)
They didnt go on vacation very often. (one error)
The dr. said his leg was broken. (one error)
Mrs Jones sent him a box of candy. (one error)

APPENDIX D

Student Record Sheet I

Name _____ I.Q. _____

Section _____ Reading _____

Group _____ Handwriting _____

	Total Errors	Errors Corrected	Net Score
CAPITALIZATION			
PUNCTUATION			
End punctuation			
Comma			
Quotation marks			
SENTENCE STRUCTURE			
Incomplete sentence			
Run-on sentence			
Lack of clarity			
Omitted, twice-written, unnecessary words			
GRAMMAR AND USAGE			
Verb form			
Noun number			
Possessives			
Word choice			
SPELLING			
TOTAL			

APPENDIX E

Student Record Sheet II

Name _____ I. Q. _____

Section _____ Reading _____

Group _____ Handwriting _____

	Pretest			Posttest			
	Total Errors	Errors Corrected	Net Score	Total Errors	Errors Corrected	Net Score	Net Gain Score
CAPITALIZATION							
PUNCTUATION							
End punctuation							
Comma							
Quotation marks							
SENTENCE STRUCTURE							
Incomplete sentence							
Run-on sentence							
Lack of clarity							
Omitted, twice-written, unnecessary words							
GRAMMAR AND USAGE							
Verb form							
Noun number							
Possessives							
Word choice							
SPELLING							
TOTAL							

APPENDIX F

PHASE I

RAW DATA: GROUP A

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0001	128	12.0	40	0	1	3	0	2	6
0002	137	8.1	50	3	2	0	0	1	6
0003	142	10.5	50	2	1	0	0	1	4
0004	97	7.5	90	0	0	1	4	3	8
0005	125	8.2	50	0	0	0	1	0	1
0006	106	6.4	80	0	0	1	1	1	3
0007	96	4.6	30	11	1	6	0	1	19
0008	116	10.8	90	0	1	0	0	1	2
0009	129	10.4	30	0	1	1	1	0	3
0010	105	6.0	20	0	4	2	1	3	10
0011	127	8.5	50	0	2	0	0	0	2
0012	134	10.8	30	1	3	1	0	3	8
0013	128	9.7	30	0	0	0	0	1	1
0014	122	9.0	90	0	0	1	0	0	1
0015	125	10.5	30	0	3	4	0	1	8
0016	131	11.9	40	3	5	0	0	3	11
0017	96	7.0	90	3	0	2	1	3	9
0018	115	6.5	80	0	3	1	2	1	7
0019	118	9.0	20	1	1	0	1	1	4
0020	112	9.5	90	0	0	1	0	1	2
0021	119	7.0	90	0	3	0	1	2	6
0022	103	7.2	70	4	3	1	0	0	8
0023	123	11.5	40	2	3	1	1	0	7
0024	119	7.1	30	3	4	2	1	4	14
0025	116	8.7	60	0	0	2	0	4	6
0026	108	8.2	60	1	0	0	0	2	3
0027	99	6.3	20	1	4	0	5	4	14
0028	133	10.9	20	0	0	0	0	1	1
0029	124	10.6	50	0	0	2	0	1	3
0030	140	11.1	70	1	1	1	0	2	5
0031	134	11.1	30	0	0	0	0	0	0
0032	126	10.1	40	0	4	0	0	0	4
0033	125	8.7	20	1	4	2	0	3	10
0034	124	8.0	20	2	2	2	1	2	9
0035	141	11.8	20	1	2	4	0	1	8

PHASE I--Continued

RAW DATA: GROUP A

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0036	91	6.2	20	0	3	0	3	1	7
0037	105	6.1	20	6	1	1	4	15	27
0038	125	6.8	30	0	1	0	0	2	3
0039	104	7.6	90	0	1	1	2	1	5
0040	127	10.4	70	0	0	3	2	2	7
0041	126	7.0	70	2	3	1	3	2	11
0042	123	8.1	30	0	2	4	3	7	16
0043	104	8.6	20	6	10	1	3	3	23
0044	122	7.8	30	0	0	0	1	0	1
0045	107	6.3	30	0	5	1	3	5	14
0046	84	8.4	20	3	0	5	2	1	11
0047	94	9.1	50	1	5	0	0	0	6
0048	121	7.3	50	0	5	0	1	3	9
0049	97	6.1	90	0	0	0	0	1	1
0050	130	11.7	30	0	2	0	0	1	3
0051	98	6.7	20	18	6	3	3	6	36
0052	124	6.7	20	8	4	5	1	11	29
0053	117	9.4	60	0	1	0	0	0	1
0054	107	5.4	20	0	4	3	3	4	14
0055	98	6.2	30	2	2	3	6	3	16
0056	108	9.6	50	0	11	3	1	0	15
0057	126	8.9	40	2	0	3	0	3	8
0058	121	10.7	20	1	5	0	1	5	12
0059	125	8.8	50	0	0	4	1	0	5
0060	92	5.9	60	1	3	2	0	3	9
0061	129	9.9	30	1	1	2	0	2	6
0062	111	7.7	20	4	1	2	5	1	13
0063	116	6.6	20	1	5	0	0	7	13
0064	81	4.6	30	0	3	4	4	9	20
0065	109	6.2	30	1	1	4	3	2	11
0066	80	4.6	20	13	2	2	4	7	28
0067	100	5.0	30	4	14	5	5	3	31
0068	88	3.2	60	4	6	6	2	5	23
0069	105	5.8	80	1	8	2	2	4	17
0070	111	5.2	20	3	2	2	3	7	17
0071	92	6.6	50	1	0	0	2	5	8
0072	112	5.3	40	3	1	3	6	4	17
0073	87	2.9	20	16	2	8	1	18	45

PHASE I

RAW DATA: GROUP B

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0074	142	11.5	20	2	1	0	0	2	5
0075	105	7.1	30	14	16	3	1	4	38
0076	132	10.8	70	1	1	2	1	1	6
0077	121	8.7	20	1	0	2	3	4	10
0078	141	10.5	50	2	3	1	0	0	6
0079	116	6.4	50	4	0	0	0	5	9
0080	121	10.3	30	1	3	0	1	2	7
0081	134	10.6	50	0	0	3	2	0	5
0082	135	9.2	20	1	4	0	0	2	7
0083	127	9.4	80	1	1	1	0	0	3
0084	129	10.8	60	0	3	0	0	3	6
0085	115	7.9	50	0	0	0	0	1	1
0086	143	11.0	30	1	7	0	0	0	8
0087	118	9.1	90	0	0	0	1	0	1
0088	107	8.3	30	0	1	2	0	2	5
0089	114	7.3	40	0	4	2	4	2	12
0090	108	6.2	20	0	2	3	0	9	14
0091	115	8.2	30	1	3	4	0	3	11
0092	139	10.6	40	0	0	0	0	2	2
0093	123	8.6	90	2	3	1	0	0	6
0094	105	6.0	30	3	9	3	0	3	18
0095	140	11.6	90	0	1	1	2	0	4
0096	113	6.4	70	0	1	0	1	1	3
0097	120	8.6	40	1	2	1	0	2	6
0098	127	10.2	50	1	1	1	1	0	4
0099	103	6.3	80	0	1	1	0	0	2
0100	120	7.7	50	1	1	2	1	0	5
0102	105	7.5	20	0	4	1	4	5	14
0104	138	9.3	20	1	1	0	4	5	11
0105	103	8.9	30	3	0	1	1	6	11
0106	124	9.5	30	2	4	0	0	3	9
0107	140	10.7	60	2	0	4	0	1	7
0108	122	8.9	20	0	0	3	0	3	6
0109	131	9.2	50	0	3	2	0	0	5
0110	98	6.1	50	0	0	1	0	1	2
0111	97	7.0	90	0	0	0	0	0	0
0112	128	11.8	20	0	1	0	0	1	2
0113	93	6.0	20	3	6	2	2	4	17

PHASE I--Continued

RAW DATA: GROUP B

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0114	128	10.2	30	2	1	2	0	4	9
0115	124	10.6	40	0	0	1	0	1	2
0116	119	10.3	50	0	0	0	0	0	0
0117	118	9.1	30	0	1	8	0	1	10
0118	110	7.6	30	0	1	2	1	2	6
0119	114	7.2	30	0	1	0	1	4	6
0120	126	12.2	30	0	1	0	0	2	3
0121	131	7.9	90	0	0	2	1	0	3
0122	126	10.5	20	0	3	2	0	4	9
0123	112	8.1	30	0	0	3	3	3	9
0124	115	9.7	20	2	0	2	1	9	14
0125	125	7.0	70	4	4	0	0	3	11
0126	126	10.4	20	1	0	0	0	1	2
0127	109	8.2	30	3	0	0	1	8	15
0128	126	9.2	40	0	1	0	2	3	6
0129	115	8.0	30	0	2	0	0	0	2
0130	105	7.3	30	3	2	4	2	0	11
0131	109	8.2	20	0	5	2	0	1	8
0132	115	6.7	20	0	0	1	0	2	3
0133	131	9.7	30	0	0	2	0	0	2
0134	131	6.5	90	2	3	4	2	0	11
0135	111	7.7	30	0	2	3	2	4	11
0136	122	9.9	30	1	8	4	2	3	18
0137	134	10.2	20	2	2	3	2	5	14
0138	93	4.4	30	15	12	2	4	10	43
0139	108	4.3	70	1	3	2	5	5	16
0140	116	5.2	40	0	0	0	3	10	13
0141	86	7.4	30	8	0	2	0	12	22
0142	104	6.0	70	10	3	2	3	4	22
0143	88	5.4	50	1	1	8	10	1	21
0144	112	3.6	60	0	2	3	4	14	23
0145	89	2.3	20	5	0	8	9	23	45
0146	105	4.0	20	2	22	4	1	14	43
0147	108	6.4	20	5	16	8	1	8	38
0148	107	6.3	40	1	0	1	2	2	6

PHASE II

RAW DATA: GROUP X

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0201	120	11.0	70	0	- 03	0	0	- 02	- 05
0202	117	6.8	20	2	- 04	2	0	10	10
0203	109	6.7	50	0	3	1	- 01	0	3
0204	138	10.0	30	- 01	2	1	0	2	4
0205	92	5.4	70	1	3	3	2	0	5
0206	100	6.1	50	9	0	2	0	1	12
0207	124	11.0	30	- 01	0	0	- 01	2	0
0208	137	10.2	50	0	2	0	0	1	3
0209	106	7.7	30	0	5	1	- 01	0	5
0210	115	8.7	70	1	- 02	0	1	1	1
0211	117	7.7	40	1	- 03	3	0	- 02	- 01
0212	113	6.0	30	0	5	0	0	4	9
0213	112	6.3	40	- 01	2	2	2	03	8
0214	85	6.1	30	2	3	0	1	3	9
0215	100	8.5	70	4	- 04	0	0	1	1
0216	134	10.4	40	0	- 02	2	1	1	2
0217	106	4.9	40	- 01	3	0	0	3	5
0218	119	9.2	20	2	1	2	2	2	9
0219	83	4.6	50	6	- 04	- 02	3	4	7
0220	73	5.6	20	1	- 11	0	- 02	3	- 11
0221	115	5.4	20	3	- 02	4	0	0	5
0222	112	7.4	30	4	3	4	0	2	13
0223	108	7.8	50	- 01	- 01	- 01	2	0	- 01
0224	117	9.0	50	1	1	0	- 02	- 03	- 03
0225	111	8.1	20	3	4	3	- 03	- 02	5
0226	73	5.6	30	0	0	- 01	- 01	3	1
0227	111	6.1	30	1	- 02	2	0	- 02	- 01
0228	116	6.2	80	0	- 03	1	0	0	- 02
0229	118	10.5	60	0	1	1	0	3	5
0230	112	7.9	30	6	1	0	1	5	13
0231	128	10.9	40	1	- 01	1	- 01	0	0
0232	122	7.8	40	- 03	- 02	1	1	- 02	- 05
0233	105	5.6	30	0	- 08	0	1	0	- 07
0234	116	7.2	40	2	0	5	0	1	8
0235	114	7.5	50	1	3	- 04	0	4	4

PHASE II

RAW DATA: GROUP Y

Student Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0236	131	10.3	90	0	3	0	0	0	3
0237	105	7.8	30	2	1	2	1	0	6
0238	106	8.7	60	0	2	0	- 01	8	9
0239	116	10.0	60	3	7	0	1	2	13
0240	121	8.3	80	0	0	- 01	- 01	2	0
0241	110	6.9	90	2	3	0	3	0	8
0242	110	4.9	60	0	- 05	- 01	0	5	- 01
0243	115	6.1	30	0	- 02	0	0	9	7
0244	133	10.0	90	0	0	0	0	1	1
0245	114	8.9	40	0	0	0	0	3	3
0246	80	5.4	70	0	- 01	2	0	1	2
0247	109	8.7	30	0	- 02	1	0	- 01	- 02
0248	134	8.8	20	0	- 01	2	- 03	2	0
0249	108	8.4	20	2	4	0	1	1	8
0250	104	6.1	40	- 01	- 07	0	0	- 01	- 09
0251	108	7.6	80	1	- 01	- 02	1	- 01	- 02
0252	96	8.9	30	7	- 11	1	- 01	2	- 02
0253	117	6.6	80	6	- 04	4	4	1	11
0254	83	6.8	30	1	- 02	- 01	- 03	2	1
0255	109	8.1	30	0	- 02	- 01	3	4	4
0256	83	5.3	30	1	- 03	2	- 01	1	0
0257	111	6.7	30	0	0	0	2	5	7
0258	89	6.6	70	0	0	0	0	1	1
0259	106	4.6	20	1	0	2	- 03	0	0
0260	86	5.1	30	3	- 03	1	- 03	3	1
0261	123	7.1	40	- 01	0	0	- 04	1	- 04
0262	106	6.5	40	1	- 05	2	1	- 01	- 02
0263	108	9.9	20	- 02	- 02	3	5	- 03	1
0264	108	6.5	30	0	- 02	4	1	2	5
0265	127	7.9	80	0	- 01	2	1	- 02	0
0266	108	7.8	90	0	- 13	3	- 01	- 02	- 13
0267	92	6.3	50	- 01	- 04	0	0	- 01	- 06
0268	99	5.7	30	1	- 04	- 02	- 04	0	- 09
0269	115	7.1	90	- 01	- 01	0	0	0	- 02

PHASE II

RAW DATA: GROUP Z

Subject Number	Intelligence	Reading	Handwriting	Capitalization	Punctuation	Sentence Structure	Grammar	Spelling	Total
0270	121	10.7	90	- 01	0	0	0	0	- 01
0271	126	6.9	30	3	4	0	2	11	20
0272	117	7.3	70	- 01	- 05	1	0	4	- 09
0273	126	8.9	50	0	2	1	1	0	0
0274	114	7.2	50	- 01	0	2	- 01	- 02	- 02
0275	117	10.1	80	0	- 06	1	1	- 02	6
0276	127	8.5	40	0	- 05	1	0	- 01	- 07
0277	120	7.6	40	2	- 01	1	4	4	10
0278	93	7.6	50	0	- 03	0	1	- 01	- 03
0279	116	6.8	50	0	- 08	3	2	1	- 02
0280	109	7.2	90	0	- 01	3	0	0	2
0281	104	5.9	30	- 01	- 04	- 01	- 02	6	- 02
0282	114	8.6	90	0	0	- 01	0	0	- 01
0283	124	9.4	70	- 01	1	0	0	0	0
0284	90	6.9	40	0	7	- 03	- 04	3	3
0285	138	10.1	90	1	- 01	- 01	- 02	1	- 02
0286	99	6.1	80	- 01	- 03	- 01	0	- 03	- 08
0287	102	5.2	60	- 04	- 03	1	- 01	0	- 07
0288	102	6.3	20	3	- 01	3	0	7	12
0289	123	8.9	20	4	1	- 01	- 02	- 04	- 02
0290	104	6.1	30	0	0	1	- 01	- 01	- 01
0291	137	10.5	50	0	- 06	- 01	- 01	2	- 06
0292	116	10.1	20	- 01	- 01	2	0	3	3
0293	114	5.9	50	- 01	- 07	1	2	- 02	- 07
0294	119	9.8	70	- 01	0	3	3	- 01	4
0295	99	6.3	50	0	- 05	0	- 03	- 06	- 14
0296	121	7.3	40	- 01	- 02	- 02	- 02	- 04	- 03
0297	99	4.5	30	0	- 03	- 02	1	- 04	- 08
0298	134	11.3	50	- 01	- 02	0	1	- 03	- 05
0299	109	5.8	20	0	1	1	- 01	0	1
0300	102	5.9	40	2	2	0	1	2	7
0301	92	6.6	90	- 01	- 04	1	2	- 05	- 07
0302	127	8.4	40	3	- 02	- 01	3	2	5

Typed by Laura Alcorn